## REMARKS

### Information Disclosure Statement

Applicant notes that an Information Disclosure Statement and Form PTO-1449 are being submitted. Applicant would appreciate the Examiner initializing and returning the Form PTO-1449, indicating that the information has been considered and made of record herein.

### Summary of the Rejections

Claims 19-20 are withdrawn from consideration.

Claims 1 and 16 were rejected for insufficient antecedent basis.

Claims 1, 16 and 21 were rejected for being vague and indefinite.

Several of the remaining claims, including the independent claims 1, 16 and 21 were rejected by the Examiner as being unpatentable by the U.S. Patent No. 5,763,277 to Zhu and the Taylor publication (Anal. Chem. 1992, vol. 64, 1741-1744).

These rejections are respectfully traversed.

### Summary of the Response

Claims 1 and 11 have been amended to provide proper antecedent basis. Claim 21 has been amended to recite a widen detection section.

**Traversal of Rejections**

35 USC 112 Rejection

The Examiner rejected claims 1 and 16 for insufficient antecedent basis for "the first width" limitation. Applicant has amended claims 1 and 16 to correct for the antecedent basis.

The Examiner stated that the term "transition" is vague. Applicant respectfully disagrees. Referring to Fig. 13, which clearly shows a "transition" of a flow path of a first width to a second width. Intuitively, anywhere a flow path goes from a first width to a second width, inherently there must be a transition from the first width to the second width. This is the case with Fig. 13, as is also the case in Fig. 2B, and further in Fig. 9B and Fig. 10B. When viewed as a whole, Applicant respectfully submits that the disclosure supports the meaning of "transition", and claims 1 and 11 are definite, given the disclosure of the specification as a whole, as to allow one or ordinary skill in the art to fully appreciate the scope of claims 1 and 11. The scope of the claim is definite, as it is to be interpreted in light of the specification. Furthermore, the Examiner failed to demonstrate that one of ordinary skill in the art would not reasonably be apprised of the scope of the claims. Further, Applicant notes that the related patent application serial no. 09/887,872 had issued as U.S. Patent No. 6,529,275, which claims also employ that "transition" recitation based on essentially a similar disclosure with respect to this issue. To find the use of similar recitation in the present application to be indefinite would be inconsistent with the examination of the related patent.

The Examiner stated that the term "close proximity" in claim 21 is vague and indefinite because there is no definition of the term provided in the specification. Applicant respectfully traverses the rejection. The term is understandable when read in light of the specification (e.g., page 13, lines 10-15; page 15, lines 17-23; page 17, lines 1-18; page 22, lines 10-20). The scope of the claim 21 is definite, as it is to be interpreted in light of the specification. Furthermore, the Examiner failed to demonstrate that one of ordinary skill in the art would not reasonably be apprised of the scope of the claim.

35 U.S.C. § 102(b) Rejection of Claim 21

The Examiner rejected independent claim 21 as being anticipated by Taylor et al (Axial-Beam Laser-Excited Fluorescence Detection in Capillary Electrophoresis, Anal. Chem. 1992, vol. 64, 1741-1744). Taylor does not disclose a system in which a separation channel has a widened detection section defining a widened detection zone. Rather, Taylor discloses a system in which an optical fiber (core diameter 46 μm, cladding = 50 μm, jacket = 51 μm) is inserted into a capillary of 75 μm i.d. Taylor does not disclose the capillary having a widened section at the detection zone, but rather a capillary having a uniform width along its length, even at the detection zone.

Independent claim 21 has been amended to incorporate the limitation of the detection zone having a width larger than the width of the separation channel. Accordingly, independent claim 21 as amended is not anticipated by Taylor.

35 U.S.C. § 103(a) Rejections

The present invention is directed to detection system and a bio-separation system, in which the emitted radiation is axially detected along the separation medium. Specifically, the present invention is directed to detection system and a bio-separation system, in which the detection zone for optical detection of sample analytes is located at a widened zone along the separation channel. Referring to Fig. 2B in the present application, and page 16, lines 18+, it is noted that as the analytes flow from the separation channel 504 of capillary column 22 into the collar 10, the analytes remain subject to the applied potential. As a result, the analytes continue to maintain separation state (i.e., in the form of a series of separate analyte bands) as they migrate/flow past the detection zone 20. Some mixing or diffusion of the analytes may occur in the collar near the exit of the separation channel 504, but analytes "regroup" into separated state as they continue down along the collar 10 towards the detection zone 20. The detection zone 20 is preferably located at 100-500 x ID of the collar 10 from the transition to the widened zone, more like 225 times the ID, to provide sufficient distance for the analytes to regroup before detection at the detection zone 20. Because the diameter of the detection zone is larger than the diameter of the separation channel 504, the analyte bands are narrower in the axial direction. Thus the detection resolution can be improved as a result.

Zhu does not teach or suggest that the detection zone could or should be located at a distance 100 to 500 times of the diameter of the widened section from the transition to the widened section, as required by the independent claims 1 and 16 as amended.

Zhu is silent in the written disclosure as to the location of the detection zone, much less disclose defining the detection zone to be at such distance from the transition. Fig. 3 in Zhu

shows the fiber optic 3 inserted into the increased inner diameter 1d of the bore 2, with the tip within 1 time of the increased diameter 1d from the transition from the smaller diameter. The Examiner noted that it is unclear as to the position of the optic fiber 3 with respect to the increased diameter. Applicant respectfully disagrees.

Fig. 3 in Zhu illustrates that the tip is about 1d (diameter of the bore 2) away from the transition. Absent any written description to the contrary, a reasonable reading of Zhu can only lead to the conclusion that the tip is placed closed to the transition from the smaller diameter. This conclusion is further bolstered by the fact that Zhu did not address the concern with mixing and diffusion and regrouping of analyte back into separated state. Applicant submits that it is not necessary to include recitation of mixing and diffusion and regrouping of analyte in the claims in order to distinguish from Zhu. By recognizing the benefits of positioning the detection zone at about 100-500 ID of the increased width, the present invention enables improved detection of separated analytes, by taking into consideration of effects of mixing, diffusion and regrouping. Such considerations and benefits need not be recited in the claims, since the limitation of the specific location of the detection zone would allow such benefits to be accomplished. It is believed that Zhu intended to detect the effluent exiting the smaller diameter separation capillary column, instead of doing what the present invention does, by detecting separated analyte bands that finally "settled" in the larger diameter section of the separation channel, which is still under influence of applied potential. Without recognizing the benefits accomplished by the claimed invention, and how to achieve such benefits, it cannot be said that Zhu renders establishing a detection zone at the recited distance from the transition to be merely a result of routine experimentations. Such conclusion by the Examiner requires impermissible hindsight reconsideration made possible only with the benefits of the disclosure of the present invention.

Independent claims 1 and 16 as amended consequently are not render obvious by Zhu. It follows that all the claims dependent therefrom should also be patentable over Zhu.

**Conclusion**

In view of all the foregoing, Applicant submits that the claims pending in this application are patentable over the references of record and are in condition for allowance. Such action at an early date is earnestly solicited. The Examiner is invited to call the undersigned representative to discuss any outstanding issues that may not have been adequately addressed in this response.

The Assistant Commissioner is hereby authorized to charge any additional fees under 37 C.F.R. §§ 1.16 and 1.17 that may be required by this Response and associated documents but have not been enclosed, or to credit any overpayment to **Deposit Account No. 501288** referencing docket no. 1031/205.

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Respectfully submitted,

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